Michelia champaca Linn.

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Published in:
Seed Leaflet

Publication date:
2012

Document version
Publisher's PDF, also known as Version of record

FOREST & LANDSCAPE

SEED LEAFLET

No. 158 August 2012

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Taxonomy and nomenclature

Species name: *Michelia champaca* Linn.
Family: Magnoliaceae
Synonym(s): *M. aurantiaca* Wall. Champ.Ver., *M. pilifera* Bak.f., *M. velutina* auct. non DC.
Vernacular/common name: The most common is variations of the word champaca or abbreviated to champa, e.g. fragrant champaca or golden champa. In Philippines known as Ilang-ilang and in Indonesia as Cempaka kuning.

Distribution and habitat

The tree is native to India, but cultivated throughout the tropical and sub-tropical zone of South-east Asia extending from Nepal, India, Sri Lanka, Bangladesh, China, Indochina, Myanmar, Thailand, Malaysia to Indonesia. It is distributed in primary lowland to montane rain forest from 600-2100 m altitude. The annual rainfall varies from 2250-5000 mm. It grows best under very moist conditions on deep fertile, well-drained preferably sandy loam soils. Its natural habitat is dense evergreen forests. The species is extremely sensitive to fire; even large trees may be killed by low ground fire. The tree is moderately frost resistant. Hailstorms occurring in March-April, destroy the flowers and the young fruits.

Use

The wood is yellowish to olive brown, somewhat lustrous, smooth, straight-grained, medium-textured, light and soft. It is an excellent wood for cabinet-work, carving, turnery, pattern-making, posts and shipbuilding. It is also suitable for plywood for tea chests, packing cases, boxes, battery separators, and pencils. The species is a host for silkworm. Flowers yield an essential oil used in perfumery and a yellow dye used for dying textiles. The plant has medical properties. For example, the bark is considered stimulant, diuretic and febrifugal; dried root and root bark are purgative and emmenagogue; the juice of the leaves is used in colic; flowers and fruits are useful in dyspepsia, fever and in kidney diseases. Seed oil has antibacterial properties.

Botanical description

Michelia champaca is an evergreen fast growing tree with a tapering crown of ascending branches, attaining a height up to 50 m, with a clean, straight cylindrical bole of 18-21 m, without buttresses and free from forks. Self-pruning ability even in its early stages. Bark thick, grey to grayish white, inner bark fibrous, yellow to brown, crown conical or cylindrical. Leaves ovate to lanceolate, 13-35 cm long, 5-9 cm wide, finely acuminate glabrous above, stipules adnate to or free from petiole. Flowers are large, axillary, solitary or rarely in pairs, tepals 6-21, in 3-6 usually subequal whorls, pale yellow to orange, fragrant; stamens many, anthers with a short to prominently elongated connective; gynoecium stipitate, with spirally arranged, free or connate, carpels containing many ovules.

Flower of *Michelia champaca*

Fruits of *Michela champaca* (Photo by Holla Srinath)

Fruit and seed description

Fruits: Aggregate fruits consists of long clusters of 3-20 brown capsules, on a spike about 7.5-15 cm long. Capsules are ovoid or ellipsoid, become dry and woody at maturity and open at the back by two valves, releasing seed that hang from its funicle. Each capsule contains 2-6 reddish seeds.
Seeds: Seeds are dark brown, angular and covered with pink/red fleshy arils. 1 kg contains 10-20,000 seeds.

Flowering and fruiting habit

The tree starts flowering at an early age, fruits are produced abundantly, sometimes periodic fruiting with 2-3 years interval. In India, flowers appear in the hot and rainy seasons from April onwards at intervals. The fruits ripen during August-November the following year. The flowers are protogynous and are pollinated by beetles, which feed on the stigmas, pollen, nectar and secretion from the petals. Good seed years are expected almost every year, however in some areas a good seed year occurs once in three years. A large quantity of seed is destroyed by birds and rodents.

Seed collection

Fresh fruits are collected from the trees by lopping the fruit bearing branches or plucking the fruits. Ground collected seeds are often attacked by insects. Proper care should be taken while collecting the seeds as fruit-ripening takes more than one year; therefore, branches bearing mature fruits also bear the flowers of the current year. The optimum period of collection is when fruit is fully mature. At that time the fruits turn grayish brown and start to dehisce exposing the soft, red pulp inside. The colour of the seed should be black and the moisture content of seed is 20-25 %.

Processing and handling

Fruits are spread in shade for 2-3 days until they open. Seeds are then separated by gentle thrashing. The red pulp is washed off in water by rubbing on wire net and hardware cloth. Clean seeds are then dried under shade. At the time of washing, water test should be performed to discard the light seeds which float on water. Seeds can be treated with an insecticide before sowing to prevent insect damage.

Dormancy and pretreatment

Germination percentage is low in fresh seeds. Seeds have physiological dormancy and pretreatment with GA3 at the rate of 500 ppm for 24 hours can improve the germination up to 80 %. Dormancy can also be overcome by cold stratification 5-12°C. Sand is the appropriate media for germination. Germination takes about one month.

Storage and viability

Seeds are orthodox and can tolerate desiccation to 4-5 % mc and storage under freezing (-20°C) conditions. Seeds are viable at subzero temperature up to 6 months but germination drastically declines after this period. At ambient temperature or moderate cooling to 10°C seeds will maintain viability for only about 6 months at any moisture content. However seeds can be viable for more than one and a half year in aerated moist storage at 5°C.

Sowing and germination

Fresh seeds are sown in shaded nursery either broadcast or in drills 8-10 cm apart, with a thin layer of earth sprinkled over the seeds. Thatch grass or brushwood may sometimes be spread over the bed to hasten germination. Germination is completed after about 45 days. Germination varies from 20-70 %. Seedlings can be pricked out in the polythene bags or transplanted in beds at a spacing of 10 cm. One year old nursery seedlings, with ball of earth, are fit for planting out in the following rains. The tree coppices well and stump planting has also been successful at some places.

Phytosanitary problem

Urostylis punctigera is a serious pest of *Michelia champaca*. Spraying with a suitable mixture of nicotine sulphate and soap water or smoking under the affected trees is helpful. Biological control by *Pachyneuron pentatomivora*, a parasite, *Calvia tricolor*, a predator or red ant can be introduced. *Rynchothrips champaceae*, another insect, attacks the leaves resulting in dying off. *Rhizoctonia solani*, a soil borne fungus, causes leaf spotting and blight of seedlings in the nursery can be controlled by proper sanitation and cultural practices or raising of seedlings in polypots instead of beds.

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